

Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/EP05/000193

International filing date: 10 January 2005 (10.01.2005)

Document type: Certified copy of priority document

Document details: Country/Office: EP
Number: 04075239.6
Filing date: 28 January 2004 (28.01.2004)

Date of receipt at the International Bureau: 23 February 2005 (23.02.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



World Intellectual Property Organization (WIPO) - Geneva, Switzerland
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse

10. 01. 2005

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Patentanmeldung Nr. Patent application No. Demande de brevet n°

04075239.6

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Im Auftrag

For the President of the European Patent Office

Le Président de l'Office européen des brevets
p.o.

R C van Dijk



Anmeldung Nr:
Application no.: 04075239.6
Demande no:

Anmeldetag:
Date of filing: 28.01.04
Date de dépôt:

Anmelder/Applicant(s)/Demandeur(s):

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Bezeichnung der Erfindung/Title of the invention/Titre de l'invention:
(Falls die Bezeichnung der Erfindung nicht angegeben ist, siehe Beschreibung.
If no title is shown please refer to the description.
Si aucun titre n'est indiqué se référer à la description.)

Triglyceride fat composition, its manufacturing and food products comprising said
triglyceride fat composition

In Anspruch genommene Priorität(en) / Priority(ies) claimed /Priorité(s)
revendiquée(s)
Staat/Tag/Aktenzeichen/State/Date/File no./Pays/Date/Numéro de dépôt:

Internationale Patentklassifikation/International Patent Classification/
Classification internationale des brevets:

A23L1/40
A23D9/00
C11C3/02
C11C3/10

Am Anmeldetag benannte Vertragstaaten/Contracting states designated at date of
filing/Etats contractants désignées lors du dépôt:

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL
PT RO SE SI SK TR LI

TRIGLYCERIDE FAT COMPOSITION, ITS MANUFACTURING AND FOOD PRODUCTS COMPRISING SAID FAT

Field of the invention

- 5 The present invention relates to a fat that can conveniently be made into a solid, free-flowing fat powder, and to its application in particulate food compositions. The fat is more in particular (a blend of) triglycerides of fatty acids, wherein the composition is low in triglycerides of trans-unsaturated fatty acids.

Background of the invention

- 10 There is a large group of food compositions (e.g. savoury food compositions) that are in a granular or particulate form, packaged in e.g. portioned sachets. Such compositions are often dry, and can yield an edible product upon mixing with water, optionally with heating. Dry in this context is to be understood as comprising less than 15% (wt), preferably less than 10% (wt) of
15 water. Examples of such products are e.g. powdery soup- and sauce mixes (or ingredients thereof, such as binders), but also dessert mixes, which can be (part of) instant products (e.g. instant pasta with a particulate sauce composition, either in separate packaging or in joint packaging). Such compositions usually contain fat and either salt or sugar, next to a range of other components (flavourings, colourings, herbs, spices, dried vegetable particles or powder,
20 dry pieces of meat or cheese, etcetera). The consumer is very much used to such granular or particulate form, and thus this is a desired physical format.

- The fats in such compositions usually comprise a considerable amount of triglycerides of fatty acids (hereinafter for short: triglycerides). Fats are usually mixtures of various triglycerides.
- 25 The type of fat or fat blend used for a given purpose is determined (next to availability and price) by e.g. the properties the fat has and how it performs in a given product, and in the manufacture of such product. The fat should perform well on e.g. taste, melting in the mouth, taste keepability, but also on ability to be processed into a suitable product as well as performance in the packed product, e.g. keepability. Additionally, in the present case, the fats
30 should be compatible with the desired granular or particulate form of the whole composition. This means that for some purposes a small amount of liquid fat (liquid at room temperature, i.e. oil) may be employed, as that can be e.g. adsorbed by the other granular ingredients. There are, however limits to the amount of such liquid oil, if still a granular or particulate dry savoury composition is needed (e.g. it should not form one big lump in the package). When
35 more than a certain amount of fat is desired, not all fat can be in the form of liquid oil. For

other purposes (e.g. specific manufacturing processes) a liquid fat is not desired at all. Hence, a fat is needed which is to a large extent solid at room temperature, and which can be made in a granular or particulate form, preferably as a free flowing powder. Particulate form for the fat in this context is to be understood as fat in the form of powder, flakes or granules, all with a size smaller than 2x2x2 mm, preferably less than 1x1x1 mm, more preferably less than 0.5x0.5x0.5 mm.

The triglycerides (which form part or all of the fat) are usually obtained from vegetable sources and may have been subjected to various treatments, such as fractionation (dry or wet), purification, hardening, interesterification, blending etcetera, to give the fat the desired product properties. Hardening unsaturated fat or triglycerides to saturated or partially unsaturated fat or triglycerides is in particular a tool used to obtain the desired melting behaviour. In this way, oils or soft fats can be turned into fats showing more suitable properties for solid or dry formulations.

The hardening process may lead to formation of a certain amount of so-called trans-unsaturated fatty acids (and/or triglycerides of such trans-unsaturated fatty acids), in short TFA's. For various reasons it may be desired to reduce or eliminate the amount of trans-unsaturated fatty acids (and triglycerides thereof) in products. For spreads (margarines and the like) a wide range of possible alternative fats and triglycerides are proposed, as is disclosed in e.g. WO 97/16978 and WO 96/39855.

The triglycerides mentioned in such applications frequently contain lauric acid (C12 saturated fatty acid). It has been found that when one wishes to find an alternative for the trans-unsaturated fatty acids (and fats containing them) in savoury applications lauric acid is undesired. Lauric acid and triglycerides containing lauric acid may show a range of desirable properties, in particular melting behaviour, but in a savoury application triglycerides of lauric acid were found to lead to a (soapy) off-flavour, especially after prolonged storage.

Hence, there is a desire for dry, granular or particulate (savory) products which contain triglyceride fats which are low in trans-unsaturated fatty acids (e.g. below 5% of the total fats present, preferably less than 2%), but which still should perform well in a (savory) composition, in particular concerning processability, fat staining, crystallisation, mouthfeel, and other characteristics as mentioned above. Preferably, such product should also be low in lauric acid or triglycerides thereof (e.g. below 10% of the total fats present, preferably less

than 3%, most preferably less than 0.5% wt of the total fats present). Solutions to this have been proposed in patent application PCT/EP03/12031. However, herein it is not addressed how a solid, particulate fat, preferably even a free flowing fat powder, low in transunsaturated fatty acids can be obtained. A possible solution could be to use high-melting fats. However, such fats do often not display acceptable behaviour in the final product, e.g. mouthfeel, melting in the mouth (they can be waxy), etcetera. Thus, there is a need for a fat which can be made into a fat particulate at room temperature, preferably a free-flowing fat powder, in a convenient way. Additionally, such fat should display good properties in the final product.

10 Triglyceride fats can be grouped according to the fatty acids of which they consist (i.e. the acyl moiety of triacyl glycerides). Such groups can be identified by a letter, and herein:

H means saturated fatty acid of 16 carbon atoms or longer (C16+, e.g. up to C24)

U means unsaturated fatty acids in cis conformation (any chain length)

E means unsaturated fatty acids in trans conformation (any chain length)

15 M means saturated fatty acids of 10-14 carbon atoms (C10-C14)

As the present application is about triglycerides of such fatty acids, the fatty acid composition of the triglycerides is given by for example:

H3 (meaning a triglyceride of 3 saturated fatty acids of 16 or more carbon atoms)

20 H2E (meaning a triglyceride of 2 saturated fatty acids of 16 or more carbon atoms and 1 trans-unsaturated fatty acid)

H2M (meaning a triglyceride of 2 saturated fatty acids of 16 or more carbon atoms and 1 saturated fatty acid of 10-14 carbon atoms)

H2U (meaning a triglyceride of 2 saturated fatty acids of 16 or more carbon atoms and 1 cis-unsaturated fatty acid)

25 HE2 (meaning a triglyceride of 1 saturated fatty acid of 16 or more carbon atoms and 2 trans-unsaturated fatty acids), and so on for other 3 letter codes.

Fat compositions can thus be characterised in containing certain weight percentages (based on the total amount of triglycerides) of triglycerides of the above codes.

30 Although it is mentioned for E and U that they may have any length, it is to be understood that this relates to fatty acids of approx. 8-24 carbon atoms, and more usually 16-20 carbon atoms. Known fatty acids in triglycerides are palmitic acid (C16:0) and stearic acid (C18:0). The contents of these in fatty acid triglycerides can be measured.

Summary of the invention

It has now been found that the objectives as given above may be met (at least in part) by a particulate fat comprising triglycerides of fatty acids, wherein the amount of H3 (triglyceride of 3 saturated fatty acids of 16 or more carbon atoms) and H2U (triglyceride of 2 saturated fatty acids of 16 or more carbon atoms and 1 cis-unsaturated fatty acid) taken together is at least 55% (preferably at least 65%) wt based on the total amount of triglycerides, and wherein the the ratio palmitic acid / stearic acid in the fatty acid triglycerides is less than 4. Preferably, said ratio is below 3, more preferably below 2.

- 10 In other words: $H3 + H2U \geq 55\%$, preferably $\geq 65\%$ wt, based on total triglycerides, next to the referred ratio palmitic acid / stearic acid in the fatty acid triglycerides. This means that of the total amount of triglycerides present in the fat composition according to the invention at least 55% wt (preferably at least 65% wt) are triglycerides of fully saturated C16 and longer chains (e.g. C16, C18, C20, C22 and C24) and/or triglycerides containing one cis-unsaturated fatty acid of any chain length and two saturated fatty acids of 16 or more carbon atoms

- 20 Additionally, it was found that it is preferred that the amount of stearic acid in the triglycerides is at least 15% of all fatty acids in the triglycerides, preferably at least 20%, more preferably at least 25%. Preferably, the ratio palmitic acid / stearic acid in the fatty acid triglycerides is at least 0.2, preferably at least 0.5 (in connection to any of the given upper limits given above).

- 25 Regarding the crystallisation properties, it was found that for the given purpose, it is important that the fat composition is such that a combination of high level of solid formation (in a given time) and a fairly rapid onset of crystallisation is achieved (and not just the latter, which can be achieved with known fats, whilst still the mouthfeel and other properties in use should be good. An indication of the solids formation and crystallisation speed can be given by crystallisation experiments and N-value measurements

- 30 It was found that the fat as specified above can be processed into the required particulate fat (or even more preferred into a free-flowing fat powder) by a spray-cooling said fat.

Detailed description of the invention

- 35 In the fat according to invention it is preferred that the amount of H3 (triglyceride of 3 saturated fatty acids of 16 or more carbon atoms) is at least 20% wt based on the total amount of triglycerides, preferably at least 25%. Also, it is preferred that the amount of H2U (triglyceride

of 2 saturated fatty acids of 16 or more carbon atoms and 1 cis-unsaturated fatty acid) taken together is at least 30% wt based on the total amount of triglycerides. Apart from the amounts of H3 and H2U it can be preferred to use fats of such composition in a particular ratio. In this case, the ratio H3/H2U is preferably between 0.5 and 1.2.

5

It is preferred that the amount of H (i.e. saturated fatty acids of 16 or more carbon atoms) of the fat is between 55 and 80%, preferably between 60 and 75% wt based on total amount of fatty acids. Normally, only fatty acids are used with even number of carbon atoms. Similarly, it is preferred that the amount of U (cis-unsaturated fatty acids of any suitable chain length) is between 20 and 45% wt based on total amount of fatty acids.

10

In the fat according to the invention the amount of palmitic fatty acid (C16:0) in the triglycerides is preferably between 25 and 50% wt based on the total amount of fatty acids.

15 A preferred particulate fat (preferably free-flowing) according to the invention comprises 25-100% of an interesterified fat blend of:

(a) 40-80% PO (palm oil) and

(b) 20-60% of a fully hardened fat such as from rape (with a melting point of 68°C, i.e. RP68) and/or from soybean oil (with a melting point of 65°C, i.e. BO 65), and/or sunflower (oil or fully hardened).

20

Alternatives to this can be interesterified fat blends of the same part (b) above, but for part (a) a blend of a dry-fractionated palm stearin (e.g. with a melting point of approx. 53°C) and unhardened rape oil.

25 Following the invention, it is now possible to manufacture a particulate savoury food composition comprising 0.5-50% wt (preferably 1-40% wt) of particulate fat according to this invention, 2-80% wt (preferably 5-50%) of an edible salt and which composition contains less than 15% wt (preferably less than 10% wt) of water. In this, the triglycerides can be selected such that they contain less than 5%, preferably less than 2% wt of trans-unsaturated fatty acids, and preferably having less than 10% wt (more preferably less than 3%, most preferably less than 0.5%) of lauric acid, and wherein the fats still have the desired melting and crystallisation behaviour. Usually, such compositions further comprise 0.1-50% wt of starch and/or flour and/or maltodextrin and/or 0.1-50% wt of herbs and/or spices and/or tomato powder and/or vegetable pieces and/or monosodium glutamate.

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Examples of composition according to the above are particulate soup- or sauce concentrates, which yields a soup or sauce upon mixing and heating with an aqueous liquid. Such soup- or sauce concentrates are in particulate form, preferably as a free flowing powder. As mentioned, a small amount of liquid oil (e.g. 0.1-5%, wt based on the total composition) may be present.

5

Following the above, it is now possible to manufacture e.g. dry, particulate (preferably free-flowing) soup or sauce concentrates which contain a large proportion of vegetable fats, which composition is substantially free from trans-fatty acids or triglycerides thereof.

10

In the compositions above at least 50% of the fats is of vegetable origin, and the compositions substantially free from trans-unsaturated fatty acids or triglycerides thereof. Preferably, the compositions according to the invention are substantially free from animal fat.

EXAMPLES

15

Fat blends 1-3 were prepared from blending various fats and fats specifically produced according to the top section of table 1. POs is a dry-fractionated palm stearin with a melting point of approx. 53°C, PO is an unhardened palm oil, PO 58 is a palm oil hardened to a melting point of 58°C. The fatblend "Mix A" was prepared by interesterification of a 60% palm oil (PO), 40% rape 68 blend (RP68). In the second half of table 1 the fatty acid composition is given in accordance with the definitions as herein defined. The same data are given for other fat as comparative example (A) and (B).

20

Table 1

	A	B	1	2	3	
Mix A			35	65	100	
POs	100	45	65	35		
PO		40				
PO58		15				
H3	34	34	34	33	33	
H2E	0	0	0	0	0	
H2M	1	2	1	1	1	
H2U	42	39	42	42	42	
HE2	0	0	0	0	0	
H3/H2U	0.81	0.86	0.79	0.79	0.80	
H3+H2U						
H	68	66	69	69	70	
E	0	0	0	0	0	
U	32	34	31	31	30	
Palmitic (P)	60	52	50	41	31	
Stearic (S)	6	13	18	27	39	
P/S	10	4	2.8	1.5	0.8	

Note: the numbers of all the fats given with 3-letter codes do not add up to 100%, as some minor amounts of other fats are also present.

- 5 Fats 1, 2 and 3 could be made into free-flowing powder by conventional spray cooling.

The fats and fat blends of table 1 have been analysed for their crystallisation rate and N-values. N-value measurements are a standard in the fat industry. The crystallisation rate as here measured was done by fully melting the fat, and then holding at a temperature of 20°C.

- 10 After intervals of 5, 10, 15 and 20 minutes the content of crystallised fat was measured (using NMR). The results are set out in table 2.

Table 2 crystallisation rates and N-values

	A	B	1	2	3	
Crystall. Rate in solids at 20°C after:						
5 minutes	37	39	37	38	40	
10 minutes	52	49	48	43	44	
15 minutes	57	52	62	61	55	
20 minutes	59	54	64	69	68	
N-values						
N10	78.9	79.4	76.2	76.8	74.8	
N20	64.7	66.3	70.6	72.2	60.7	
N30	44.8	45.5	48.7	52.6	42.3	
N35	35.6	35.6	38.3	41.7	34.2	
N40	27.5	26.1	28.5	31.2	26.4	
N50	11.4	0.2	0.4	4.8	5.5	

Fat blend 3 above has been used in the following compositions.

	Soup powder	Sauce powder
Ingredients (wt %)		
Salt, starch, flour, sugar	63	48
Herbs and spices	9	3
Milk powder	17	45
Vegetable pieces	3	0
Fat powder as 3 above	6	3
Liquid oil (SF)	2	1

- 5 The products were made using conventional processing. Both were powdered mixes, which could be made into a soup and sauce in a conventional way.

CLAIMS

1. Particulate fat comprising triglycerides of fatty acids, wherein the amount of H3 (triglyceride of 3 saturated fatty acids of 16 or more carbon atoms) and H2U (triglyceride of 2 saturated fatty acids of 16 or more carbon atoms and 1 cis-unsaturated fatty acid) taken together is at least 55% wt based on the total amount of triglycerides, and wherein the ratio palmitic acid / stearic acid in the fatty acid triglycerides is less than 4.
5
2. Particulate fat according to claim 1, wherein the ratio palmitic acid / stearic acid in the fatty acid triglycerides is less than 3.
10
3. Particulate fat according to claim 2, wherein the ratio palmitic acid / stearic acid in the fatty acid triglycerides less than 2.
4. Particulate fat according to claim 1-3, wherein the ratio palmitic acid / stearic acid in the fatty acid triglycerides is at least 0.2, preferably at least 0.5.
15
5. Particulate fat according to claim 1-4, wherein the amount of stearic acid in the triglycerides is at least 15% of all fatty acids in the triglycerides.
20
6. Particulate fat according to claim 5, wherein the amount of stearic acid in the triglycerides is at least 20% of all fatty acids in the triglycerides.
7. Particulate fat according to claim 1-6 wherein said amount of H3 + H2U is at least 65% wt based on the total amount of triglycerides.
25
8. Particulate fat according to claim 1-7, wherein the amount of H3 (triglyceride of 3 saturated fatty acids of 16 or more carbon atoms) is at least 20% wt based on the total amount of triglycerides, preferably at least 25%.
30
9. Particulate fat according to claim 1-8, wherein the amount of H2U (triglyceride of 2 saturated fatty acids of 16 or more carbon atoms and 1 cis-unsaturated fatty acid) taken together is at least 30% wt based on the total amount of triglycerides.

10. Particulate fat according to claim 1-9, wherein the ratio H3 / H2U is between 0.5 and 1.2.
- 5 11. Particulate fat according to claim 1-10, wherein the amount of H is between 55 and 80% wt based on total amount of fatty acids.
12. Particulate fat according to claim 1-11, wherein the amount of U is between 20 and 45% wt based on total amount of fatty acids.
- 10 13. Particulate fat according to claim 1-12, wherein the amount of palmitic fatty acid (C16:0) based on the total amount of fatty acids is between 25 and 50% wt.
14. Particulate fat according to claim 1-13, comprising 25-100% of an interesterified fat blend of 40-80% PO (palm oil) and 20-60% of a fully hardened rape fat with a melting point of 68°C (RP68) and/or a fully hardened soybean oil with a melting point of 65°C (BO 65) and/or sunflower (oil or fully hardened).
- 15 15. Particulate fat according to claim 1-14, which is a free-flowing powder.
- 20 16. Process for preparing the particulate fat according to claim 1-15, wherein a melted fat according to claim 1-15 is spray-cooled.
17. Particulate savoury food composition comprising 0.5-50% wt (preferably 1-40% wt) of particulate fat according to claim 1-15, 2-80% wt (preferably 5-50%) of an edible salt and which composition contains less than 15% wt (preferably less than 10% wt) of water.
- 25 18. Composition according to claim 17, wherein the composition further comprises 0.1-50% wt of starch and/or flour and/or maltodextrin.
- 30 19. Composition according to claim 17-18, wherein the composition further comprises 0.1-50% wt of herbs and/or spices and/or tomato powder and/or vegetable pieces and/or monosodium glutamate.

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20. Composition according to claim 17-19, in the form of a particulate soup- or sauce concentrate, which yields a soup or sauce upon mixing and heating with an aqueous liquid.

12

ABSTRACT

A fat that can conveniently be made into solid particulates or preferably a free-flowing fat powder (by spray cooling), which is low in triglycerides of trans-fatty acids, and its application in particulate food compositions. More specifically, the fat comprises (a blend of) triglycerides of fatty acids, wherein the amount of H3 (triglyceride of 3 saturated fatty acids of 16 or more carbon atoms) and H2U (triglyceride of 2 saturated fatty acids of 16 or more carbon atoms and 1 cis-unsaturated fatty acid) taken together is at least 55% wt based on the total amount of triglycerides, and wherein the ratio palmitic acid / stearic acid in the fatty acid triglycerides is less than 4.

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